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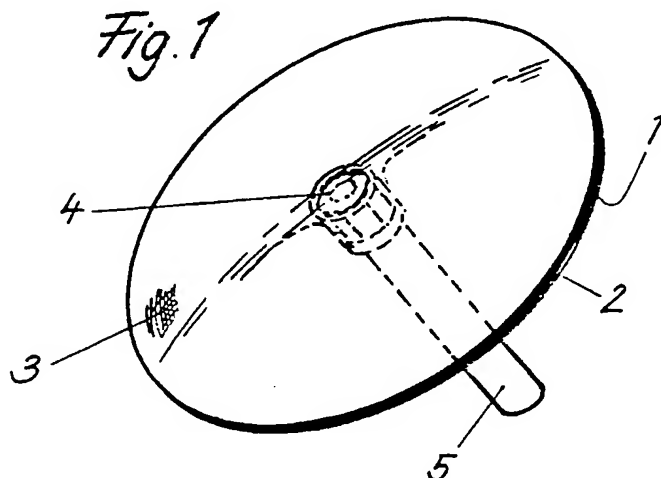
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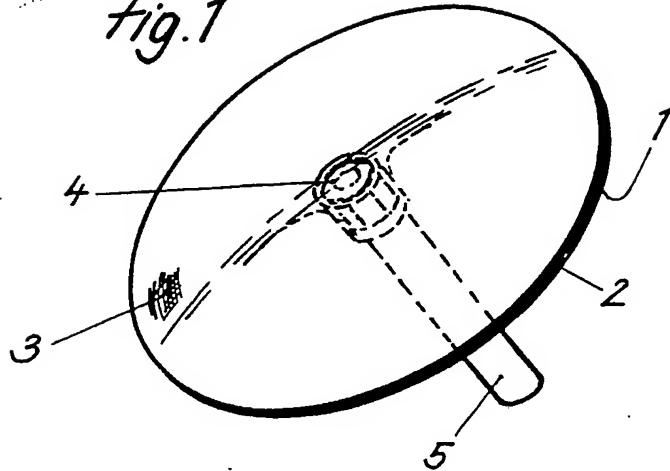
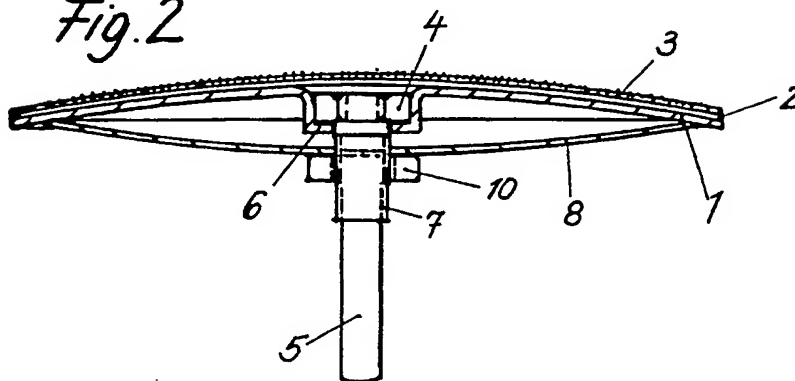
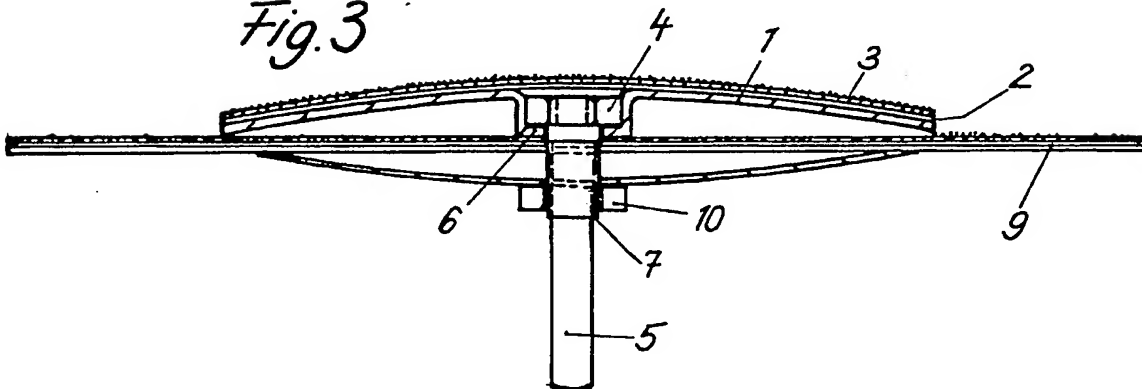
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(54) Grinding or polishing device

(57) A grinding or polishing device with a long working life comprises fibre portions (2) coated with a bonding agent and carrying abrasive grains (3), the fibre portions (2) with the abrasive grains (3) being attached to a semi-rigid profiled synthetic carrier (1) by means of an adhesive compound, especially by a mixed adhesive or by contact adhesive. In this way a long working life is achieved without the danger of failure and, in addition, a multiplicity of basic shapes is made possible through a compact non-interchangeable adhesive connection between an inexpensive carrier material made of semi-rigid thermoplastics and abrasive grains on a fibre base, with a certain elasticity to absorb shocks.



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Fig. 1*Fig. 2**Fig. 3*

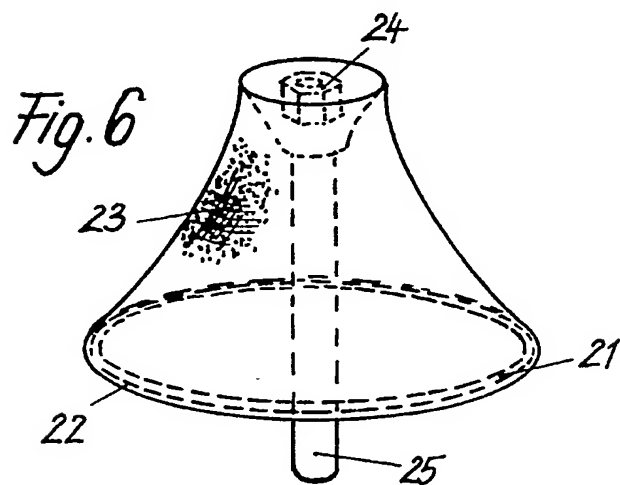
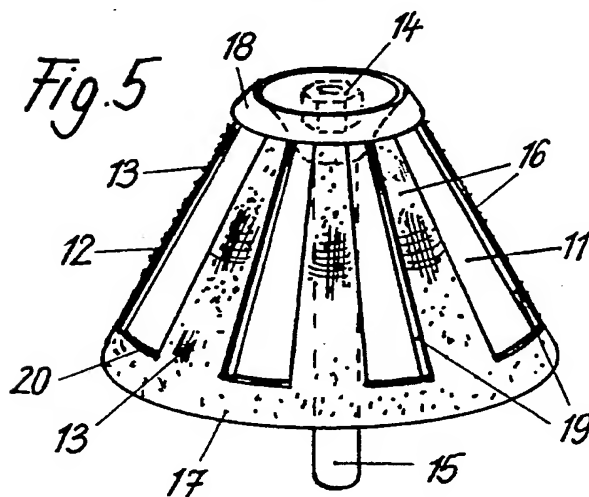
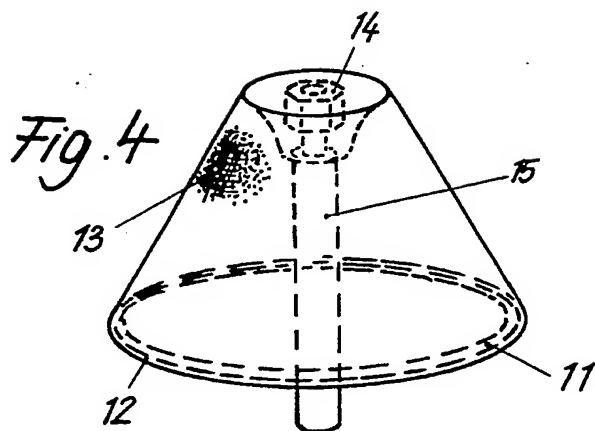


Fig. 7

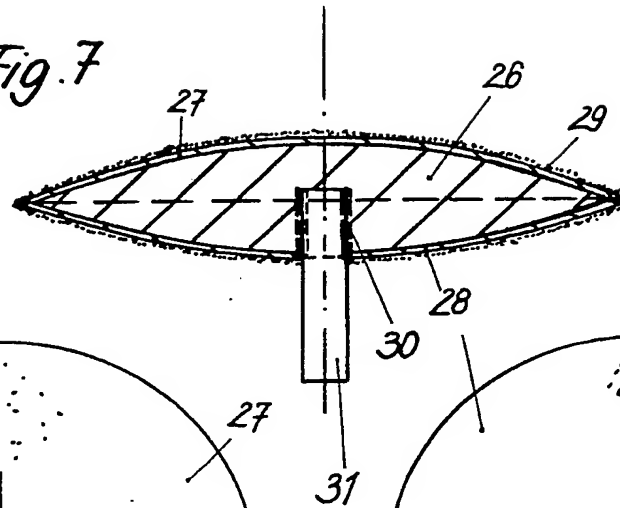


Fig. 8

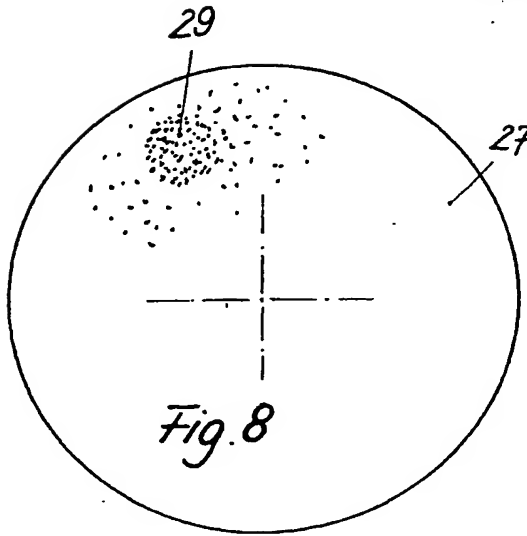


Fig. 9

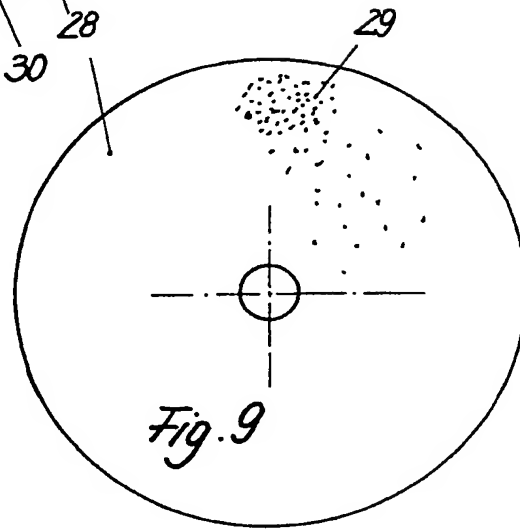


Fig. 10

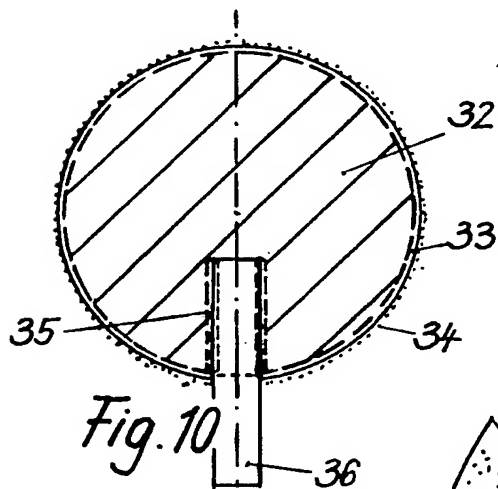


Fig. 11

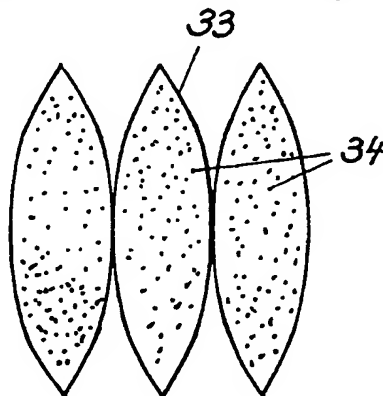
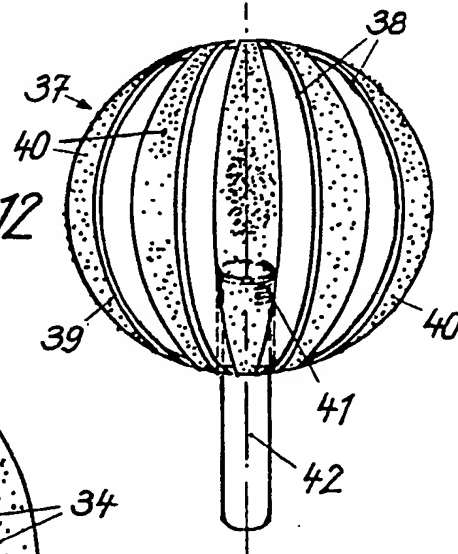


Fig. 12



"GRINDING OR POLISHING DEVICE"

DESCRIPTION:

The present invention relates to a grinding or polishing device comprising fibre portions or base coated with a bonding agent and carrying abrasive grains especially applied electrostatically, the fibre portions with the abrasive grains being secured to a carrier of synthetic material. The grinding or polishing device which has a long life is intended for use in both the home and in industry.

Grinding or polishing devices are known comprising a mushroom shaped base body of flexible synthetic material, the synthetic surface of which base body becomes soft when heated whereupon an abrasive grain coating can be applied to the base body. In the abrasive grain coating, pyramid-shaped abrasive grains are embedded at random so that as well as pyramid points, pyramid base areas also point outwards. This abrasive coating does not therefore grip very well and rapidly becomes worn. In addition, grinding heats the elastic synthetic device which consequently becomes softer so that the device experiences reduced grinding resistance.

It is also known that grinding plates made of synthetic material can be removably attached to a card or cloth base by means of a contact adhesive or adhesive in a grinding coating. Furthermore it is also known that the grinding coating on an even fibre base can be interchangeably attached to grinding plates made of synthetic material or metal by means of a central screw arrangement. In the latter case, although the abrasive grain can be electrostatically applied to the synthetic carrier coated in bonding agent, this is only possible if there is a constant distance between the even carrier material and the abrasive material being applied. Here the peaks of the grains point outwards so that the abrasive grain coating stays sharper for a longer period of time. This also makes for rapid interchanging of the abrasive coating, although intensive grinding is limited by grip, and under heavy loads failures can easily occur at the edge of the grinding device.

It is an object of the present invention to provide an abrasive grain coating on a synthetic base which coating is sharp, has a long working life without the likelihood of failure and in addition come in various basic shapes, whereby a compact non-interchangeable connection is achieved, in the case of synthetic grinding devices, between an inexpensive carrier material and the abrasive grains and their substrate, with a certain elasticity for absorbing shocks occurring during grinding.

According to the present invention there is provided a grinding or polishing device comprising fibre portions coated with a bonding agent and carrying abrasive grains applied electrostatically or by other means, the fibre portions with the abrasive grains being permanently attached by means of an adhesive compound to a semi-rigid synthetic carrier having a selected profile.

By means of the present invention the advantages of a vulcanised fibre base with applied abrasive grains are also utilized for a semi-rigid synthetic grinding device. A bonding-coated fibre base with electrostatically applied abrasive grain can be produced inexpensively in continuous webs and once fibre portions have been cut out they can be shaped in a pressure tool in accordance with the synthetic body or on the latter itself. If a tool is used, it should preferably have a slightly greater profile than the synthetic carrier in order to counteract any counter shaping. After the preformed fibre portion with the abrasive grains has been permanently attached to the profiled synthetic body by means of an adhesive, the fibre base, which is very sensitive to moisture, can no longer be distorted. This also eliminates the failure and bending tendency of fibre discs/plates. As an abrasive grain, diamond, zircon, carborundum, silicon carbide or similar can be used and mixed adhesives are preferred, although contact adhesives are easier to use.

The profiled synthetic carrier body, in the form of a plate, mushroom, cone, spindle, lens or sphere can consist of thermoplastic material in a semi-rigid form for the attaching of correspondingly shaped fibre portions with abrasive grain in circular, ring or strip form etc. This has the advantage of light weight and on becoming blunt can easily be exchanged for a new grinding device without the problems of fixing abrasive grain by means of contact adhesives or adhesive locking, which until now has not been possible in the case of profiled grinding devices with vulcanised fibres and abrasive fibre. With thinner semi-rigid grinding plates or lens form grinders, narrow slits, particularly saw teeth, can be cut without the danger of failure at high speeds.

Embodiments of the present invention will now be described by way of example with reference to the accompanying drawings wherein:

Figs. 1 to 3 show respectively a perspective view (and two cross-sectional side elevations through slightly embossed plate or mushroom shape grinder devices;

Figs. 4 to 6 show perspective views of various cone form grinder devices;

Fig. 7 shows a sectional side elevation of a lens form grinder device while Figs. 8 and 9 show top and bottom views of the device of Fig. 7;

Fig. 10 shows a sectional side view of a spherical grinder device with Fig. 11 showing the basic blank of the grain carrying portion of the device of Fig. 10; and

Fig. 12 shows a perspective view of a spherical form grinder device including strip or lamella form abrasive grain sections.

Referring to Figs. 1 - 3, a grinding or polishing device of lightly embossed plate or mushroom form consists of a semi-rigid synthetic plate 1, on which plate 1 a preformed fibre base 2 with abrasive grains 3 is permanently attached by means of an adhesive e.g. two-phase or contact adhesive. The abrasive grains are applied to the flat fibre section electrostatically by known means. By using a semi-rigid synthetic carrier 1 with a permanently attached preformed fibre portion or base with abrasive grains the working life of the device is substantially increased vis a vis previously known grinding device applications on a synthetic base or on replaceable even abrasive grain carriers as described above.

It can also be seen that a screw nut 4 can be centrally located in the slightly curved synthetic plate 1, into which nut 4 a screw bolt 5 is screwed up to a stop 6 to enable the device to be held in a drive clamp (not shown). Referring to Fig. 2 the bolt 5 can also have a counter thread 7 onto which a screw nut 10 is counter-screwed, for applying a slightly curved counter plate 8 against the plate 1 to stabilise the plate 1, the plate 8 being slightly smaller in diameter than the synthetic plate 1. In Fig. 3, a cutting plate 9 is included intermediately for the purpose of stabilisation.

In the embodiment according to Fig. 4, a straight synthetic cone 11 serves as the base for the permanently attached fibre portion 12 with abrasive grains 13. A screw nut 14 is again provided for a bolt 15 as per the first embodiment. In accordance with Fig. 5 a grinding surface is provided in the form of strips or lamellas 16 with the lamellas being joined by an annular portion at outer edge 17 while at inner edge 18 overlapping is provided onto synthetic cone 11 by means of permanent adhesive, with cone 11 also being able to have flat grooves 19, 20 for partial recessing of lamellas 16 with annular connections 17, 18.

In the embodiment according to Fig. 6, instead of the straight cone of Fig. 4 a cone 21 having curved concave generators serves as a base for the permanent attaching of

the fibre portion 22 with the abrasive grain coating 23. Again, there is a central screw nut 24 for a bolt 25 in accordance with the first embodiment. A spindle form can be achieved by providing two cone shapes arranged opposite each other.

Figs. 7 to 9 show a synthetic carrier body 26 of lens shape with permanently attached circular and ring-shaped fibre sections 27, 28 each with abrasive grains 29. Furthermore, it can be seen that there is a screw thread 30 recessed into the synthetic body for screwing in a bolt 31.

According to Figs. 10 and 11, a synthetic body 32 is shown having a spherical form with permanently attached fibre portion 33 in shell form with abrasive grains 34 applied and with a screw thread 35 for the connection of a bolt 36.

In Fig. 12, flat grooves 38 are provided in the synthetic spherical carrier body 37 for partial recessing of the fibre portions 39 which are of spaced lamella form carrying the abrasive grains 40 and there is a screw thread 41 for a bolt connection 42.

CLAIMS:

1. A grinding or polishing device comprising fibre portions coated with a bonding agent and carrying abrasive grains applied electrostatically or by other means, the fibre portions with the abrasive grains being permanently attached by means of an adhesive compound to a semi-rigid synthetic carrier having a selected profile.
2. A grinding or polishing device as claimed in claim 1, wherein the adhesive compound is a mixed adhesive or a contact adhesive.
3. A grinding or polishing device as claimed in claim 1 or 2, wherein the fibre portions with the abrasive grains are shaped in a tool and/or are embossed.
4. Grinding or polishing device as claimed in any one of the preceeding claims, wherein the device is in the form of a slightly curved grinding plate or is of mushroom form the fibre portion with abrasive grains being permanently attached in an annular manner to the semi-rigid synthetic carrier.
5. A grinding or polishing device as claimed in any one of claims 1 to 3 wherein the device is in the form of a grinding cone or spindle with straight, or curved, external contours, the fibre portions with abrasive grains being permanently attached in a strip or ring form to the semi-rigid synthetic carrier.
6. A grinding or polishing device as claimed in any one of claims 1 to 3 wherein the device is of lens form, an appropriately shaped fibre portion with abrasive grains being permanently attached in a circular or ring manner to the semi-rigid synthetic carrier.
7. A grinding or polishing device as claimed in any one of claims 1 to 3 wherein the device is in the form of a grinding sphere, appropriate fibre portions being permanently attached to all sides of a semi-rigid synthetic carrier in a shell form.
8. A grinding or polishing device as claimed in claim 1 wherein the fibre portions with the abrasive grains are defined by a series of lamella form strips permanently attached to the synthetic carrier.
9. A grinding or polishing device as claimed in claim 8, wherein grooves are present in the synthetic carrier body to receive the lamella form strips such that the strips project from the grooves.

10. A grinding or polishing device as claimed in claim 8 and 5 or claim 8 and 7, wherein the series of lamella form strips are connected by an annular strip at one or both of the inner and outer edges of the carrier body.

11. A grinding or polishing device as claimed in claim 10, wherein said annular strip overlays edges of said lamella form strips such that the annular connection is through an inner or outer edge of the grinding device.

12. A grinding or polishing device according to any one of the preceeding claims wherein the semi-rigid synthetic carrier body has connection means for an attachment bolt or screw to facilitate interchange with a fresh grinding device when the grinding surface of the device is worn.

13. A grinding or polishing device substantially as hereinbefore described with reference to and as illustrated in any one of Figs. 1 to 6 in Figs. 7 to 9, in Figs. 10 and 11 or in Fig. 12, of the accompanying drawings.